

671946⁽¹⁾
Cariboo Bell

Prepared by Staff of
CARIBOO-BELL COPPER MINES LIMITED
Suite 300 - 999 West Pender Street
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Cover

REPORT ON EXPLORATION AND
PRELIMINARY DEVELOPMENT OF
CARIBOO BELL COPPER MINES LIMITED
COPPER DEPOSIT, CARIBOO
MINING DIVISION, BRITISH
COLUMBIA

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	MAPS - (in attached folder)	
	- Generalized geological map - Scale 1" = 500 feet.	
	- Geochemical map - Copper in parts per million - 2 sections	
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	- Pit outlines - #1, #2, #3, and #4 - Scale 1" = 200 feet.	
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	(a) Drill holes with copper assays;	
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DRAFT ONLY

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CARIBOO-BELL COPPER MINES LIMITED
Suite 300 - 999 West Pender Street
Vancouver 1, B. C.

date ?

Mr. K. J. Springer, President
Cariboo-Bell Copper Mines Limited
Suite 300 - 999 West Pender Street
VANCOUVER 1, B. C.

Dear Mr. Springer:

Pursuant to your request I submit herewith a report concerning the results of your Company's exploration to date at the Bootjack-Polley Lake property in the Cariboo Mining Division, B. C., together with conclusions and recommendations for future work.

Yours very truly,

CARIBOO-BELL COPPER MINES LIMITED

J. J. Crowhurst
Vice-President i/c
of Operations

JJC:ds

omit

ACKNOWLEDGMENTS

Assistance given by Dr. W. R. Bacon, Mr. R. F. Lambert,
Mr. R. ^{S.}Verzosa, and Mr. K. ^{W.}Midan, all of the Mastodon-Highland
Bell Mines Ltd. staff and Mr. Stan Gray, Metallurgical consultant,
is hereby gratefully acknowledged.

J. J. Crowhurst

over

Not necessary

*pleasure mention large tonnage mineable
if open pit) of .5+*
DRAFT

SUMMARY:

Work completed during the period 1964 to 1967 has explored three zones of copper mineralization and has outlined three more favourable areas as shown by copper geochemical anomalies, all of which are on the Company's mineral claims situated between Bootjack Lake and Polley Lake in the Cariboo Mining Division, British Columbia.

The explored zones contain an estimated ^{000 000} total of 33,326,200 tons in place averaging 0.500% copper, 0.015 ounces of gold per ton and 0.05 ounces of silver per ton, as indicated by surface trenching and vertical diamond drilling which extends 400 to 500 feet in depth. Of this tonnage, ^{600 000} 23,478,000 tons in place with an average grade of 0.514% copper and 0.015 ounces of gold per ton contains ^{amenable} ~~amenable~~ chalcopyrite to ordinary copper flotation methods. The ^{remainder} ~~remainder~~ ^{10,000,000} or 9,856,200 tons in place averaging 0.464% copper contains ^{secondary} varying amounts of "non-sulphide" copper bearing minerals, (tentatively identified as amorphous chrysocolla, copper arsenates or copper phosphates), and will not respond satisfactorily to flotation.

change to say C-B engineers estimate ---
Of the sulphides, it is estimated that 7,099,700 tons (before dilution), in three open pits, averaging 0.632% copper and 0.015 ounces gold per ton, can be extracted initially and can then be followed by a fourth open pit containing 2,962,400 tons (before dilution) which averages 0.612% copper and 0.015 ounces ^{gold} ~~silver~~ per ton. *Silver? gold?*

Cut off grade for this is 0.30% copper. Metallurgical recovery is estimated at 85% and overall waste to ore ratio is 2.53:1.

It is estimated this would provide sufficient operating profit in the first 5.27 years at an average price of 40¢ U.S. per pound of copper to pay back the initial capital cost of placing the property into production by means of a 6,000 ton per day sulphide flotation concentrator (2,100,000 tons per year) and related facilities. An allowance has been included in this capital cost for interest, inventory and working capital. This total capital cost is estimated at \$17,022,000.00.

(6)

SUMMARY (Continued)

Subsequently, an estimated 6,312,700 tons (before dilution) averaging 0.464% copper and 0.015 ounces gold per ton will provide \$895,000. operating profit per year for a further 3.31 years, assuming again an average price of copper of 40¢ U.S. per pound. Waste to ore ratio is estimated at 1.38:1 and metallurgical recovery at 85%.

Net overall profit before income taxes, depreciation or depletion is, therefore, estimated at \$4,462,000. during the first 8.58 years.

During this first 8.58 years an estimated additional total of 5,975,200 tons averaging 0.479% copper before dilution will be extracted from the open pits as well as that outlined above, in the form of "non-sulphides". This will be either treated separately from the sulphide flotation concentration or stockpiled pending development of an economic process. Heap leaching with or without bacterial aid could be considered. Sulphuric acid consumption appears to preclude leach-precipitation-float methods. This tonnage has been included as waste in the calculation of waste to ore ratios for the "sulphide" material.

A further 7,095,200 tons of sulphides averaging 0.400% copper before dilution amenable to flotation, plus 3,881,000 tons of "non-sulphides" averaging 0.441% copper before dilution will be left. This has been included in the total reserve estimates. The waste to ore ratio for this 7,095,200 tons of sulphide material is estimated at 2.17:1. The estimated operating cost, however, so closely approximates the estimated net revenue per ton that these sulphides are not considered economic at 40¢ U.S. per pound of copper. Since this material is largely situated in the bottom of the proposed open pits, deeper drilling may change this analysis.

CONCLUSIONS:

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Sufficient mineralization has been outlined at your Company's property to warrant aggressive and immediate further exploration and development, directed toward increasing the total tonnage of copper reserves and expanding the amount of sulphide material that contains plus 0.60% copper and can be recovered economically by conventional sulphide flotation.

Diamond drill hole spacing at present is on an east-west grid approximately 200' x 400', and depth below the surface in the mineralized areas varies from 300 feet to a maximum of 800 feet. In almost every section, good possibilities exist for expanding [?]the potential tonnage by deepening holes which ended in copper bearing material, drilling [?]in between widely spaced holes or drilling outside those previous holes which contain good mineralization.

delete pit section
The No. 3 zone (No. 2 and No. 4 Pit areas) has not been delimited to the northwest, and three interesting presently unexplored geochemical anomalies are known to be situated from 2,000 feet to 4,000 feet to the northwest, north and northeast from the present drilling. Further exploration and development should be carried out in these areas. Further metallurgical work, open pit planning and a feasibility study concurrent with this diamond drilling and other exploration is warranted by the size and grade of the copper bearing zones already discovered.

Proximity to hydro-electric power, (approximately 30 miles) favourable location with regard to roads and the Pacific Great Eastern railroad, reasonable climate conditions, good labour availability, adequate water supply, easy disposal of mill tailings on adjacent ground, all contribute toward the property's assets, and present an attractive picture.

No. 3
*Think can be covered in brief summary
and Recommendations*

RECOMMENDATIONS:

In and adjacent to the known copper bearing areas, B. X. vertical diamond drilling totalling 19,700 feet, and 17,000 feet of sampling rotary or percussion drilling ^{TOTALLING} should be carried out, with the object of:- *IN ORDER TO:-*

- (a) decrease the average distance between holes to about 200 feet maximum;
- (b) deepen existing holes which were stopped in copper mineralization; and;
- (c) explore extensions.

This footage is as shown in the Appendix and would be distributed depending on results approximately as follows:-

- | | | |
|-----|--|------------------------|
| (a) | 27 "Fill-in" holes - #2 & #3 Zones | totalling 17,000 feet. |
| (b) | 23 "Deepening" holes - #2 & #3 Zones | " 5,300 feet. |
| (c) | 23 "Exploration" holes - #2, 3 & 4 Zones | " 14,400 feet. |

This drilling will explore volumes of rock that could contain a possible maximum of 72,000,000 tons. Assuming that the results show that one quarter of this volume does contain sulphide mineralization of the same tenor as that previously found and amenable to ordinary copper flotation methods, 18,000,000 tons of sulphides could be added to the reserves previously quoted.

An additional 8,000 feet of B. X. diamond drilling is recommended to explore the northerly extensions of the mineralization, including in part the geochemical anomalies. This could be preceded by induced polarization surveys and/or detailed surface prospecting.

During this drilling program further simple copper flotation testing should be completed on those portions of the drill core and cuttings that contain less than 15% of the total copper in the form of "non-sulphides".

Methods of treating the "non-sulphide" copper should also be investigated, since a potential of more than 10 million tons carrying 0.40% copper to 0.55% copper is indicated. Heap leaching, aided by bacterial promotion, leach-precipitation-float cyanide processes and other methods resulting in solutions containing copper that can be subsequently precipitated as plus 70% copper, should be carefully considered.

RECOMMENDATIONS (Continued)

The cost of this program is estimated to be as follows:-

(i)	Direct cost 27,700 feet - B. X. diamond drilling at \$6.00 per foot.....	\$ 166,000.
(ii)	Direct cost 17,000 feet - rotary or percussion diamond drilling at \$3.75 per foot.....	64,000.
(iii)	Metallurgical and open pit design.....	15,000.
(iv)	Assaying, administration, head office and general.....	78,000.
(v)	Induced polarization surveys, surface prospecting and other exploration.....	<u>25,000.</u>
		<u>\$ 348,000.</u> ✓

The program ~~can be started to advantage in mid March,~~ and will
require approximately eight to nine months to complete.

Respectfully Submitted

J. J. Cowhust

(16)

DRAFT (November 25, 1967)

CARIBOO-BELL COPPER MINES LIMITED

CORPORATE STRUCTURE:

As is

Cariboo-Bell Copper Mines Limited was incorporated as a public company on 23rd December 1965, under the Companies Act of the Province of British Columbia for the purpose of acquiring from Mastodon-Highland Bell Mines Ltd. and Leitch Gold Mines Limited certain claims located in the Cariboo Mining Division of British Columbia.

The Company was authorized to issue three million shares without nominal or par value, of which 1,500,005 shares are presently issued and outstanding. The consideration to Mastodon-Highland Bell Mines Ltd. and Leitch Gold Mines Limited for the sale of the property to the Company was \$50,000 cash and 750,000 shares of the Company.

PROPERTY LOCATION:

CONSISTS ONE HUNDRED AND FIFTY-EIGHT

The property, consisting of one hundred and sixty contiguous mineral claims ~~is~~ in the Cariboo Mining Division, 36 miles northeast of the town of Williams Lake, British Columbia. It is located between 52°30' and 52°35' North Latitude and between 121°35' and 121°42' West Longitude. It covers the area between Bootjack Lake and Polley Lake and extends one mile southwestward beyond Bootjack Lake.

The value of work performed on the property has been recorded for assessment purposes. As a result all of the claims are in good standing until 1974 with some dates of expiration extending until 1978.

Forty two *HAVE BEEN*
~~Forty~~ additional claims ~~were~~ staked to the south of the main group to provide an area for tailings disposal.

ACCESSIBILITY AND TRANSPORTATION:

~~Road~~ Access ^{to the property} is provided by 45 miles of excellent gravel road from a point on the

Cariboo Highway just south of Williams Lake to the north end of Morehead Lake, ^{connecting} thence

^{to a} ~~by nine miles~~ of good gravel road ^{leading} ~~southeasterly~~ ^{out} ~~to the property.~~ ^{claims.}

Transportation ^{from} ~~to~~ Vancouver ^{to} ~~from~~ Williams Lake is excellent, ^{BY RAIL VIA} involving either

^{BY ROAD VIA} the Pacific Great Eastern Railway or the Cariboo and Trans-Canada Highways.

FACILITIES:

No facilities presently exist; all mining, milling and other plant installations must be provided.

~~Part of the network of the B. C. Hydro Power transmission lines passes~~ through Williams Lake. A connection about 32 miles long would supply cheap and reliable power to the Company's property.

A bus service to and from neighbouring small villages and towns would ~~restrict~~ ^{the erection} of residential facilities (and/or bunkhouse and cookhouse operations)

^{TO A MINIMUM} ~~to a minimum.~~

Water for concentrator and plant use is readily available from any one of a number of small streams and lakes situated close to or on the property.

A tentative reserve has been placed on the water supply in the immediate area by the Provincial Government Water Rights Branch in Victoria, British Columbia, giving Cariboo Bell the first right of refusal.

HISTORY:

Early in 1964, surface prospecting and reconnaissance geochemistry carried out by Mastodon-Highland Bell Mines Ltd., indicated the presence of mineralization between Bootjack Lake and Polley Lake.

Mineral claims were staked in mid 1964. A detailed geochemical survey and a magnetometer survey, both of which outlined several anomalous zones, ^{WERE} ~~was~~ completed. The widespread mantle of over-burden prevented effective bed rock examination by the prospecting crews.

In April 1965, Huntac Limited conducted an induced polarization survey over part of the property. This area was selected ^{principally} ~~largely on the basis of the~~ geochemical results. Several anomalies, which ~~were~~ later proved ~~to be~~ caused more by pyrite than ^{by} ~~chalcopryite~~ mineralization were outlined.

During September 1965, ^{cut} ~~by means of~~ two large tractors, 19 trenches totalling approximately 21,000 lineal feet ~~were cut~~ on east-west lines spaced at 400-foot intervals. ^{which exposed mineralized rocks} These trenches cut across ~~both~~ the geochemical, the magnetic, and three of the induced polarization anomalies.

A ripper attachment on one of the tractors was used to ^{break} ~~tear~~ up the top ten to twelve inches of the copper mineralization exposed.

^{no para} Chip sampling of ~~the broken pieces~~ ^{done} ~~was then undertaken,~~ with each sample representing 10 lineal feet of trench. Copper, gold and silver assays were performed by a Vancouver laboratory, with composites being subsequently reanalyzed by a prominent United States assay office. Close correlations were obtained between all these assays.

History (Continued)

During 1964, Mastodon-Highland Bell Mines Ltd. and Leitch Gold Mines Limited jointly expended approximately the sum of \$14,000.00 on mineral claim staking, surface prospecting and geochemical work.

44,398.81

An additional \$43,411.00 was spent during 1965 by these two companies on further exploration, most of which was directed as previously noted toward one particular section of the property.

TREASURING

During the spring and summer months of 1966, 49 BX size diamond drill holes totalling 25,995 feet, with an additional 38 percussion drill holes totalling 6,585 feet, ^{were} completed. The cost amounted to \$205,704.92

An ore potential totalling 27,898,625 tons, averaging 0.50% copper and .015 ounces gold per ton ^{were} indicated by this work. Preliminary open-pit plans showed an ore to waste ratio of about 1:1.

In September 1966, negotiations with a Japanese Group consisting of Mitsui Mining & Smelting Company Ltd., Sumitomo Metal Mining Co. of Canada Ltd. and Nippon

Mining Co. Ltd. resulted ^{IN AN OPTIONAL DEVELOPMENT PROGRAMME OUTLINED} in a Letter of Intent, which covered ^{THE} as an initial step ^{and this program} the expenditure of the sum of \$300,000.00 ^{which was} ^{on} directed towards further exploration.

This sum, spent in late 1966 and ^{EARLY} 1967, increased diamond drilling to 123 BX size holes, totalling 48,325 feet.

^{no Japan} Preliminary metallurgical testing of ^{drill core} samples ^{by} submitted to Japanese

laboratories in Tokyo was disappointing, however, and the Japanese Group withdrew

from further participation in mid July, 1967.

AN EXTRACT FROM THE JAPANESE METALLURGICAL REPORT APPEARS IN THE APPENDIX PAGES A- TO A-

HISTORY (Continued)

Metallurgical testing carried out in recent months by the Department of Energy, Mines and Resources in Ottawa; the Caligher Company in Salt Lake City, Utah; and by Cominco in Kimberly, B. C.; has reasonably identified the limits of the oxidized mineralized zones which are not conducive to standard copper flotation methods. Limited microscopic work has been carried out to determine the copper minerals that resist flotation. *SEE THE APPENDIX FOR EXTRACTS FROM THESE REPORTS.*

As outlined later in this report open-pit plans have been prepared by the staff of Mastodon-Highland Bell Mines Ltd. involving *for* the mining of those selected blocks of ore which ~~it is now known~~ would provide metallurgical recoveries in the order of 80% to 90% and would contain better than average copper grade. It is suggested these blocks would constitute the feed to a concentrator during the first four years of operation. *ALL PLANS & CALCULATIONS ARE AVAILABLE IN THE COMPANIES OFFICES FOR THE REVIEW OF INTERESTED PARTIES.*

No open pit plans have been developed for those portions of the orebodies situated underneath these initial ore blocks, but approximate calculations have been made which indicate the nature and grade of this material.

GEOLOGY AND MINERALIZATION:

The Cariboo-Bell Copper Mines Limited claims cover a plug or stock, of granitic rocks including syenite, monzonite and diorite. This intrusive, the Mount Polley stock, cuts andesitic volcanics of Lower Jurassic age. The volcanics occur as inclusions or pendants^u and, in places, exhibit a significant development of garnet, pyroxene and other skarn minerals.

Several petrographic features bear witness to the close relationship of the granitic rocks, one with the other^k but the most pervasive characteristic is their quartz-free habit. These rocks are well exposed in the numerous trenches^{and} ~~which~~ exhibit a complex history of multiple intrusion, contamination, fracturing, metasomatism and mineralization. This is not revealed by the geologic map included herein, which is markedly simplified for the sake of clarity.

The commonest secondary feature of the granitic rocks is ^{their} salmon colour resulting from extensive potash metasomatism.

^{Four} ~~Three~~ pit areas are shown on the geologic map and are centres of more intense mineralization. The primary sulphides are chalcopyrite, minor bornite and pyrite. Secondary minerals consist of malachite, conichalcite and very minor amounts of chalcocite, cuprite and native copper. The vertical range over which secondary minerals occur^s is quite variable, ranging from negligible to more than one hundred feet.

Gold in the order of 0.01 - 0.04 ounces per ton occurs in the mineralized areas. *Minor silver values are present. Molybdenum has been observed in selected specimens only.*

ORE RESERVES:

Using a cut-off grade of 0.30% copper, total reserves before any allowance for dilution during mining are estimated at 33,326,200 tons averaging 0.50% copper, 0.015 ounces of gold per ton and 0.05 ounces silver per ton. ^{are} ~~This is~~ ^{over} ~~distributed between~~ three general areas, as shown in the following table, ~~before any allowance for dilutions~~

<u>Zone</u>	<u>Tons</u>	<u>Grade - % Copper</u>	<u>Units</u>
2	14,823,700	0.460 ✓	6,806,300
3	17,318,500	0.522 ✓	9,044,400
4	<u>1,184,000</u>	<u>0.664</u> ✓	<u>786,200</u>
TOTAL	<u>33,326,200</u>	<u>0.500</u> ✓	<u>16,636,900</u>

Of this total, ^{and with} ~~using~~ a cut-off grade of 0.30% copper ^{it is} ~~estimated that approximately 9,856,200 tons~~ ^{averaging} ~~which averages 0.464% copper~~ ~~and which is~~ situated in the top 100 to 130 feet, contains "non-sulphide" or oxidized copper minerals in large enough quantities to lower metallurgical recoveries below 80%. No economic method has so far been developed to treat this material.

would leave out - or put in
appendix

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METALLURGICAL INVESTIGATIONS:

(B) Mitsui - Sumitomo - Nippon

Four samples, composed of diamond drill core rejects, intended to represent the upper and lower part of the eastern, ^(core) No. 2, and the western, or No. 3, zones were sent to the Mitsui and Sumitomo testing laboratories, ~~at~~ Tokyo, in the spring of 1967. No attempt was made to separate the oxidized ("non-sulphide") material from the unoxidized sulphides. No sample was selected from the northern or No. 4 zone, which is known to be comprised of clean sulphides. The four samples were split up into six samples for the test work by segregating the western and eastern parts of No. 3 zone.

Copper metallurgical recoveries ranged from 39% to 83%. A summary of results is shown in the Appendix, and a full report received from the Japanese group is ~~on file~~ ^{in the} Company's files.

(C) The Galigher Company

Samples chosen by reference to four prospective open pit areas and representing as closely as possible horizontal layers from 30 to 50 feet thick, were sent to the Galigher test laboratories in Salt Lake City, Utah in the late summer and early fall of 1967.

Copper recovery ranged from 25% to 93% (see Appendix). Attempts to use sulphidizing reagents on the ^{non-sulphide} ~~oxidized~~ material were not successful in producing a plus 80% recovery, although part of the "non-sulphides" did report in the flotation concentrate.

Preliminary sulphuric acid leaching tests indicated consumptions in the order of 30 pounds of acid per ton of ore, which is considered an uneconomic figure.

METALLURGICAL INVESTIGATIONS (Continued)

(d) Department of Mines and Cominco

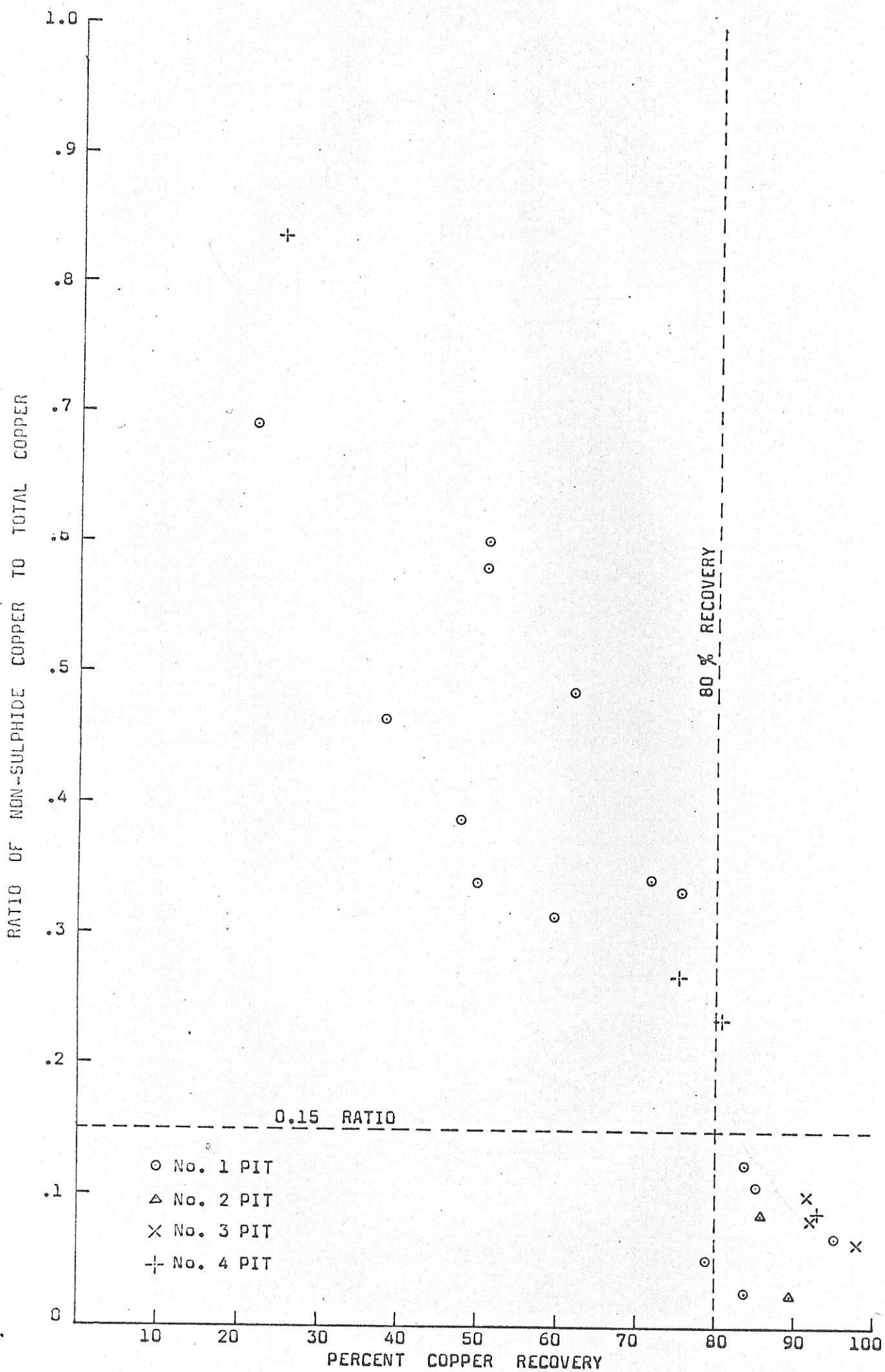
Samples similar to those sent to Galigher were submitted to Ottawa and to the Sullivan Concentrator flotation metallurgists at Kimberley, B. C.

Results parallel to those reported by Galigher were obtained (see Appendix).

(d) General

The Department of Mines staff at Ottawa pointed out that there seemed to be a direct relationship between the ratio of "non-sulphide" copper to total copper, and the metallurgical recovery. ^{See insert} Accordingly ^{accompanying} the graph shown on the following (page) was plotted; This indicates that plus 80% copper recoveries will result with conventional flotation from material containing a ratio of 0:15 or less of "non-sulphide" copper to total copper. 1:0.15

* In this brief "non-sulphide" material is defined the term given to ore having a non sulphide copper ~~ratio~~ to total copper ratio of ~~less~~ more than 0:15.



PRELIMINARY OPEN PIT PLANS:

why not design an optimum plan, using accepted waste material procedures TPL

(20)

~~ten~~ Eleven prospective open pit plans concerning approximately eleven million tons of "sulphides" and six million tons of "non-sulphides" have been investigated by the Mastodon-Highland Bell staff. The term "sulphides" is defined as material with a "non-sulphide" copper to total copper ratio of less than $0.15:1.0$ ~~0:15~~. * - See Following Page for insert

General characteristics of the pit plans are as shown in the table on the following page. These plans cover the areas of relatively higher grade copper mineralization situated close to the surface and hence ~~available~~ ^{desirable} for initial mining.

Three of the pits, F-1, D-2 and B-3 apparently contain the most favourable initial tonnage, using a cut-off grade of 0.30% copper. A fourth, B-4 outlines the next most favourable zone. Alternatives which included holes S-4 and S-28 produced higher waste to ore ratios without any improvement in the sulphide tonnage total, because these holes have ^{a relatively high} ~~an abnormally large~~ "non-sulphide" content.

Pit alternatives A-2 and B-2 which included hole S-111 were discarded in favour of D-2 because A-2 and B-2 involved much ^{higher} ~~higher~~ waste to ore ratios. Correspondingly pit plan B-4 which centred on Holes S-111 and S-49 showed a ^{more favourable} ~~reasonable~~ strip ratio.

20 foot, 30 foot and 60 foot bench intervals were investigated. A 20 foot bench was selected for mining where erratic "sulphide" mineralization occurs, as in F-1 and the lower part of D-2, in order to permit selective extraction of as much "sulphides" at as high a grade of copper as possible.

Similarly a 30 foot bench interval was chosen for B-3 and B-4 since the "sulphide" mineralization is relatively ~~quite~~ consistent in these zones.

A 30 foot interval was ~~also~~ used for the removal of the waste sections. This interval would most likely be increased in final plans to obtain minimum costs.

PRELIMINARY OPEN PIT PLANS (Continued)

No pit plans covering the removal of the remaining thirteen million tons of "sulphides" have been prepared. A "Tons and Grade" estimate was made concerning the "non-sulphide" remaining.

The polygon method of allocating areas of influence for tons and grade was used, with a uniform grade of copper being assumed for each polygon surrounding any one drill hole.

Tonnages contained in the pits were calculated by benches in four categories i.e. plus 0.50%; 0.40% to 0.50%; 0.30% to 0.40% and less than 0.30% copper.

12 cubic feet per ton was used as a factor.

Handwritten note:
*
12 cubic feet per ton
used as a factor

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CARIBOO-BELL COPPER MINES LIMITED

PRELIMINARY OPEN PIT PLANS

PLAN	PIT NUMBER	BENCH INTERVAL	PIT WALLS	DESCRIPTION OF PLAN
A-1	#1 High Grade	30'	52°	Excludes Hole S-4 Includes Hole S-28
B-1	#1 High Grade	30' - 3,950' - 3,800' 20' - 3,780' - 3,560'	52°	Excludes Hole S-4 Includes Hole S-28
C-1	#1 High Grade	30'	52°	Includes Hole S-4 and Hole S-28
D-1	#1 High Grade	60'	52°	Excludes Hole S-4 Includes Hole S-28
E-1 Upper	#1 High Grade	20' 3,880' - 3,700'	52°	Excludes Hole S-4 Includes Hole S-28
E-1 Lower	#1 High Grade	20' 3,680' - 3,520'	52°	Excludes Hole S-4 Includes Hole S-28
*F-1 Upper	#1 High Grade	20' 3,880' - 3,700'	52°	Excludes Holes S-4 and Hole S-28
F-1 Lower	#1 High Grade	20' 3,680' - 3,520'	52°	Excludes Holes S-4 and Hole S-28
A-2	#2 High Grade	30'	52°	Includes Hole S-111
B-2	#2 High Grade	20' 3,660' - 3,460'	52°	Excludes Hole S-111
*D-2 Upper	#2 High Grade	30' 3,900' - 3,690'	50°	Centred on Hole S-21
*D-2 Lower	#2 High Grade	20' 3,670' - 3,450'	50°	
*B-3	#3 High Grade	30'	50°	Centred on Hole S-15
*B-4	#4 High Grade	30'	50°	Centred on Holes S-11 and Hole S-49

*Plans used. *for economic analysis in this report*

ECONOMICS:

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A comparative summary of the estimated return of capital investment related to the construction and operation of a flotation concentrator with a capacity of 6,000 tons of ore per day is shown in the following table:-

Alternative Number	1	2	3	4
Period of time - years	4.12	5.27	4.49	4.90
Pits considered	(1,2 & 3)-(4)	(1,2 & 3)-(4)	(1,2,3) - (4)	(1,2,3) - (4)
Cut-off grade	0.40 - 0.40	0.30 - 0.30	0.40 - 0.30	0.30 - 0.40
Tons sulphides - millions	8.6499	11.0682	9.4280	10.2901
Average grade - feed to concentrator - % copper	0.655	0.581	0.628	0.600

Total profit over the life of the pits - millions \$ Canadian.

<i>Price - Cu per lb</i>				
<i>Price of Copper</i> 39¢ U.S.	12.569	14.121	13.094	13.596
40¢ U.S.	13.565	15.247	14.133	14.679
41¢ U.S.	14.562	16.374	15.173	15.763
42¢ U.S.	15.558	17.505	16.213	16.850

(See Appendix for details)

These estimates show that using a cut-off grade of 0.30% copper throughout (Alternative No. 2) will result in the maximum cash throw-off from the four open pits considered, and will repay the \$15,022,000. estimated initial outlay. This table also indicates that a price of copper amounting to 40¢ U.S. per pound or more is required to recoup invested capital including establishing working capital, an allowance for inventory and paying interest @ 7% on the declining balance during the life of the four open pits proposed for initial mining.

It has been assumed that the sum of \$2,000,000. would be obtained from the sale of part of the outstanding treasury stock, and hence would not be repaid, *NOR* as would also the funds required for further exploration and development prior to making a production decision.

It is estimated that part of the remaining "sulphides" would provide a net operating profit at the rate of \$895,000. per year for the next 3.31 years assuming a cut-off grade of 0.30% copper and a price of 40¢ U.S. per pound of copper.

These estimates *also* assume that close to 10,000,000 tons of "non-sulphides" would be stockpiled separately in the first 8.58 years, but that no revenue would be derived from any possible copper recovery process that may be developed for this material.